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# The Automobile

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WILL COMPETE FOR AMERICA IN THE INTERNATIONAL RACE.

## The International Race.

The contest for the Gordon Bennett cup, that is to take place about June 15 next at Paris, between representatives from different nations, is receiving a great deal of attention among club members. In fact, in both the French and Belgium clubs there is quite a rivalry among the members for the honor of competing for this cup.

In America there are several automobilists quite willing to compete with the crack racers of the world. Probably the best known is Mr. Alexander Winton, whose portrait in his racing automobile appears on the front page of this issue. He is one of the pioneers in the automobile industry, and knows how to build as well as to get speed out of a motor, either for short or long distances.

Last spring he made the trip from Cleveland to New York, a distance of 707 miles, in 47 hours, 34 minutes. The roads on this journey are not such as the course of the coming race will have, if it lies over the usually excellent roads of France. The automobile used on this trip was a phaeton of the standard type, and not built for a racing or touring carriage.

The Automobile Club of France has appointed MM. Rene de Knyff, Charron and Girardot, and as substitutes Count de Chasseloup-Loubat, Gilles Hourgieres, Albert Lemaitre and Levegh. The ones appointed on the second team are not satisfied with the slim chance of their getting an opportunity to compete, and want to decide their right to a place by a race between members of the club.

It is even proposed that some of the members join the Belgium club and get places on that team. In that case they would have Frenchmen competing for Belgium against Belgiums competing for the honor of France, M. de Knyff being a Belgian. Besides the above clubs, America, Germany, Austria, Switzerland, Italy and possibly one or two clubs not recognized at this time will try conclusions for this cup.

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## Automobile 'Bus Lines.

The success of the automobile promises to revive the omnibus. A number of omnibus lines are spoken of, such as between Brooklyn and New York over the East River bridge, when completed, to Greenwood, Ft. Hamilton, etc. Applications have been made for franchises in several of the smaller cities and in streets where the franchise has been denied. While estimates could be made of the cost of operating an omnibus or stage, basing it on the reports of smaller vehicles, yet practice so often developes new difficulties that the estimate would prove of little value. The automobile omnibus is in the line of progress. How far it will be able to make a way for itself and whether electricity, gasoline or steam will be the motor power the future alone will determine.

## The Storage Battery and the Automobile.

By T. A. Willard.

The storage battery is no doubt destined to occupy a permanent place as a propelling power in all kinds of automobiles. A large number of people, apparently, are looking forward to a revolution in storage batteries, and it is the opinion of many that the long-looked-for, light weight, high capacity battery will soon be discovered. It is also the opinion of many that the storage battery art is new; which of course is not true, as the invention of the storage battery was contemporaneous with that of the dynamo electric machine. Storage batteries which have been invented, placed on the market and failed are numerous.

There is probably no article of manufacture which permits of so many variations in regard to mechanical structure or capacity. Within the last few years there have been vast improvements made, not so much in regard to capacity as to perfection in mechanical details. The successful automobile battery of to-day does not have near the capacity that some of the earlier types had, but the durability of the same is many times greater.

We often read of a new discovery in storage battery. "So-and-So's battery will run a carriage a hundred miles on one charge," or "So-and-So's battery only weighs one-fourth as much as batteries which are recognized as the standard article." Now, this is all possible. A battery can be made of one-fourth the weight of the present standard type of vehicle batteries, and still have the same capacity; it must be borne in mind, however, that it is not possible to make a battery of high capacity having long life. A battery to have long life must have a certain amount of weight, and the makers of batteries which are used the most have placed this weight at a point which will allow of good durability.

To illustrate how light a battery might be made, the writer will make a comparison between the present type of battery, which is most in use, and a battery made several years ago. The present type of battery gives about seven amperes per pound of positive plate; a battery made by Fitzgerald in England gives a capacity of 16 ampere hours per pound of plate. In making this into a battery by substituting zinc for the negatives the battery could be made one-fourth the weight of the present standard type. This battery, however, would be extremely short-lived, and would not be durable enough to be commercially successful.

This battery could be put in some of the present types of carriages and would operate the same for a distance of 200 miles or one charge on a level road. Any manufacturer of storage batteries, or any expert in the storage battery business, can furnish a battery having extremely high capacity and light weight, with consequent short life; therefore, all new and wonderful inventions in the storage battery line should be thoroughly investigated before being accepted as the real thing, but a thorough investigation cannot be made in a few days. Almost any kind of a battery will give good satisfaction for a few months, but the battery which will last several years is the one which is desirable.

Going further into the automobile, it is not the battery alone which makes a successful automobile, for much depends on the motor, controller, bearings and also the wiring of the different parts. The writer has found a drop of two volts in the controller alone. All wiring in an electric automobile should be of generous size. For a carriage weighing 1,500 pounds, it should not be less than No. 4 wire. All controller contacts should be made with large surfaces, and all surfaces ground to a perfect contact. The knife-switch principle is undoubtedly the best to use on a controller, as this allows the above-named advantages to be obtained.

In regard to the motor, the writer has made break tests of many different styles and makes of motors. There is a great difference in the efficiency between a laboratory test and the motor doing actual work on the carriage. A motor can be made which would be very efficient for climbing hills, but would not be successful on good roads. One of the greatest difficulties encountered in the manufacture of the electric automobile is to know where to place the efficient point of the motor. Of course it is very desirable to have the motor of as even an efficiency as possible, but it is impossible to make a motor of any kind having high efficiency at overload and at the same time high efficiency at small load.

It is the opinion of the writer that the motor to be used on a carriage should be regulated somewhat by local conditions, that is, arrange the motor so that it will climb the steepest grade desired and then get all the efficiency possible for running on the level. In other words, a motor must not be made to climb a mountain when there are no mountains in the vicinity in which the carriage is to be used.

There will be many improvements made in regard to the motor and the different apparatus; there will also undoubtedly be some improvements made in batteries, but it is the opinion of the writer that the improvements made in the batteries will be very slight as compared with those made in other parts of the carriage. The long-looked-for feather-weight battery will not be brought out unless some new metal or combination of metals is discovered.

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Le Velo says, according to the records kept, that during the month of December there were 708 accidents in France due to horses, from which 52 deaths and 656 injured persons resulted, and during the same period 21 automobile accidents, with one death resulting.

## No Fundamental Automobile Patent.

By Charles A. Brown.

The automobile is particularly fortunate in the fact that there are no broad underlying patents which will afford an opportunity to concentrate its manufacture in any one concern or locality. The fact that the automobile industry is open to all will serve to stimulate the improvement of the vehicle and to reduce the price so that the general introduction of this means of transportation will be facilitated, and the perfection of its mechanism will ensure its retaining its place as an important factor of our life, not as a luxury only, nor as a convenience, even, but as a necessity.

The importance of competition in improving and extending the use of a device is well illustrated in the case of the telephone. Although the monopoly of the telephone by the American Bell Telephone Company has been only partially broken, the extension of the use of the telephone and the improvement in the apparatus in service have been greater during the few years since the expiration of the fundamental patents than in all the time before.

While no one concern or locality can monopolize the manufacture of the automobile, each manufacturer will have his own special features and will find it advantageous to protect them by patent; so that while, broadly, the field will be open, the alert and careful manufacturer will monopolize his own improvements by patents and will avoid the patents of others. The manufacturer who has the best features of improvement and who most carefully protects them by patents, will secure the reward of a larger demand at better prices than his competitors.

The patent situation regarding automobiles is, in certain respects, similar to, and in certain other respects different from, the patent situation regarding bicycles. It is similar in that there are no controlling patents which prohibit the making of a successful apparatus. It is similar also in that each manufacturer has points of excellence embodied in his machine which he may cover by patents and which he emphasizes in his advertisements.

The automobile patent situation, however, is different from that relating to bicycles in that the automobile is, compared with the bicycle, a complicated machine, and therefore affords vastly more scope for inventive genius than the bicycle ever did. Not only may the running and steering gear be the subjects of improvement, as with the bicycle, but the motor and the driving mechanism afford endless opportunity for mechanical and inventive skill. Under the influence of the demand for a light, efficient, simple and compact motor, a gas engine, a steam engine, and other forms of motors, have been and will be developed for automobile work, which would not have been considered possible a few years ago.

It is in such an industry as that of the automobile that the patent system works its most beneficent result, assuring the inventor the protection for his own improvement, while not restricting the field or concentrating it in the hands of one monopoly.

## The Locomobile.

Of the steam automobiles built in America at the present time, the locomobile is probably the best known. A new model of this carriage has recently been brought out resembling in general appearance No. 1, but differing in many essential details. It is heavier, more substantially built, and more complete in several respects. On the whole, it is a more comfortable carriage than the first and sold at a higher price on account of the increased cost of construction. This model is designated as Locomobile style No. 2.

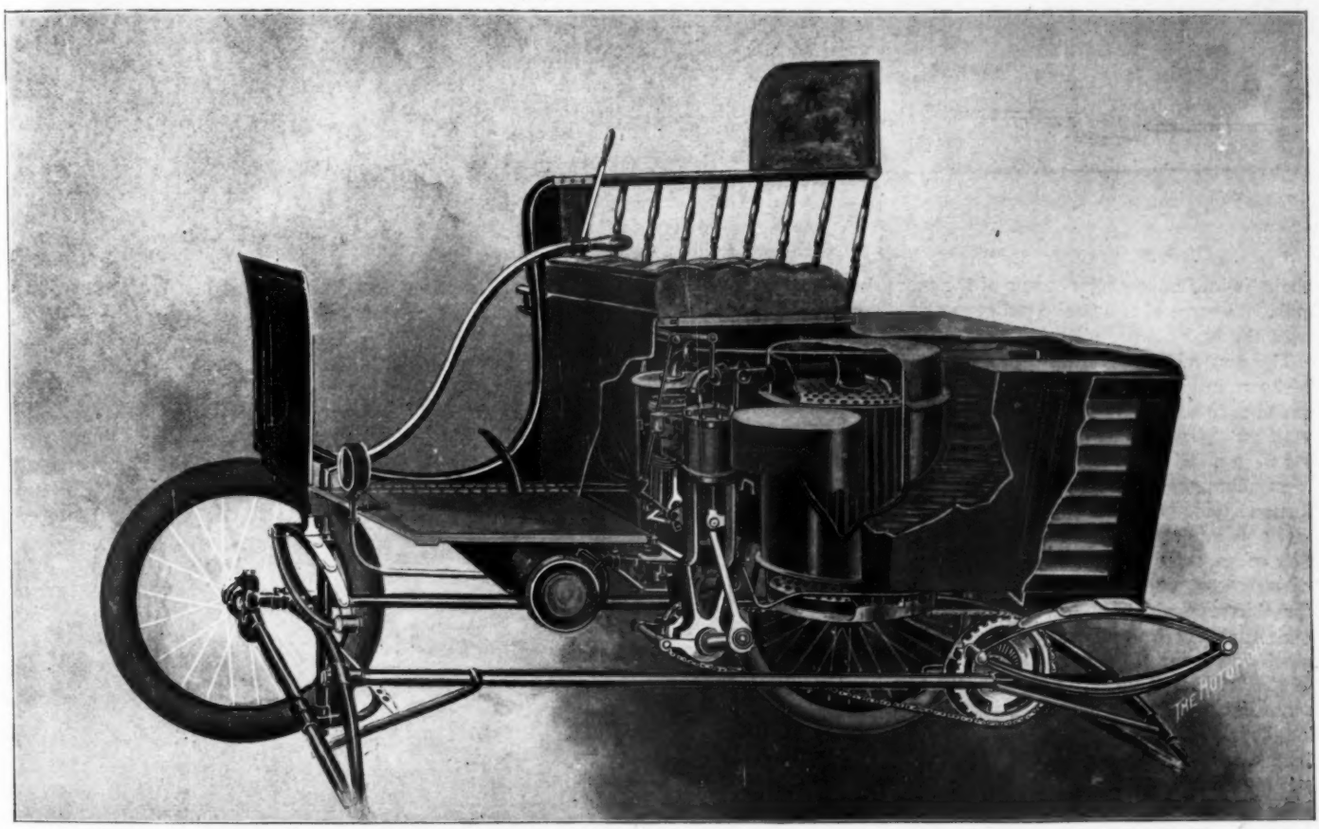


FIG. 1.—THE LOCOMOBILE—VIEW SHOWING DRIVING MECHANISM.

The general design of this automobile and arrangement of the various parts are shown in the accompanying illustrations. The frame of the running gear is built of steel tubing, the joints being made as in bicycle construction. The reaches are joined, not to the horizontal axle, but to the curved tube extending from knuckle to knuckle, and to which they are also connected by the short braces across the corners. The springs, two at the rear and one in front, are mounted on these upper tubes. The wheels are of the bicycle pattern, with pneumatic tires.

The steering arrangement is similar to that generally used on automobiles. The steering lever is fastened by a hinged joint to an upright post which turns the forward wheels at the knuckles by means of the rods just within the forward axle. The differential gear, on the circumference of which are the sprockets for the driving chain, is located near the center of the rear axle. There is also a brake pulley on this axle, the brake being operated by the foot.

The general plan of the body of carriage is shown in Fig. 2. The water tank is placed at the rear and partly surrounds the boiler with an opening just back of the boiler for filling. The gasoline fuel tank, which is an oblong cylinder, is placed beneath the forward floor of carriage. The water tank will hold sufficient water for twenty-five to fifty miles, according to the road and skill of operator, and the fuel tank sufficient for thirty to ninety miles, depending on operator. The boiler, with its furnace beneath, forms one of the most important parts of the vehicle. This is placed beneath the seat. It is an upright boiler, having a total height including furnace of less than twenty inches. The shell, which contains about 300 tubes, is wound with several layers of wire, giving increased strength with the minimum increase in weight. The tubes, somewhat less than a half inch in diameter, are expanded in the upper and lower sheets of the boiler shell. Small pipes connect the interior of the boiler with the water glass placed at the right side of the carriage body. The boiler pressure is indicated by the gauge which is placed on the dash. A safety valve is placed on the stem from the main steam pipe to engines, and is set at 200 pounds. The admission of steam to boiler is controlled by one of the three levers placed at the right of the seat.

The furnace is made of sheet metal of about the same diameter as the boiler. A large number of air tubes, surrounded by small holes, through which the gasoline vapor escapes and mixes with the air from the tubes, is the general scheme of the burner. The gasoline is carried by pipe through one of the boiler tubes to the burner, and is vaporized by the heat in its passage. The hot gases pass up through the boiler tubes and escape at the rear of the carriage. A pressure, indicated by the gauge on the dash, of about 35 pounds, is maintained on the gasoline in tank.

The supply to burners is automatically controlled by the boiler pressure. This ingeniously devised regulator contains a diaphragm so arranged that the pressure in the boiler will move the diaphragm and open or close a valve through which the gasoline is admitted. In starting a tube is used for vaporizing the gasoline that must be independently heated.

The engine is vertical, with double cylinder. Its length, including steam connections, is less than that of the boiler. The stroke is three and a half inches, and the cylinders are two and a half inches in diameter. The sprocket wheel is placed at the center of the crank shaft. Ball bearings are used throughout. The steam exhausts first into the chamber as indicated on diagram, then through the muffler at the rear of carriage.

Of the three handles at the right of seat, two short and the other long, the outside one acting through the center rod controls the feed water supply, the second acts through a hollow sleeve and reverses the engine, and the third controls the admission of steam.

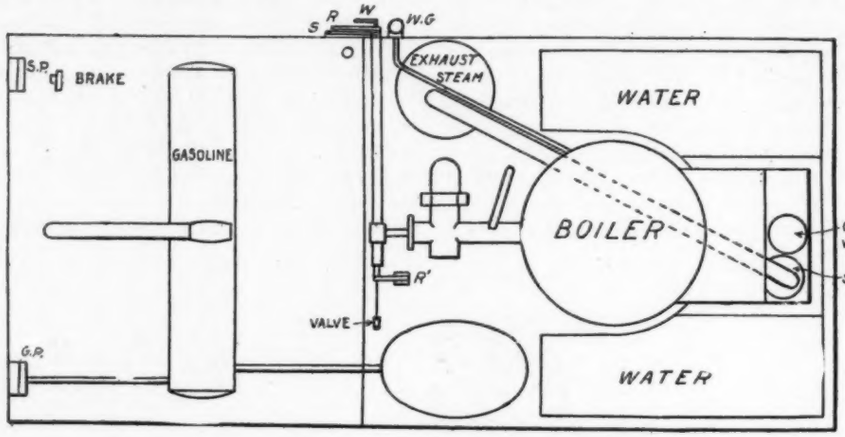
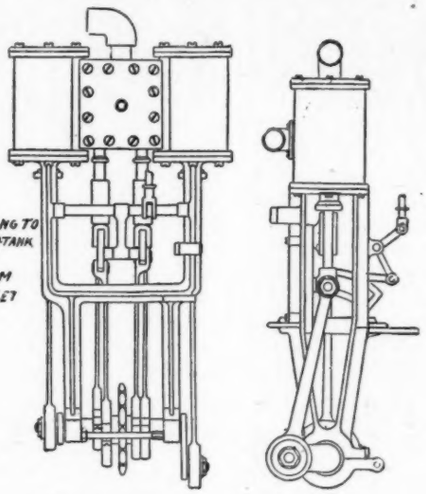



FIG. 2.—PLAN OF LOCOMOBILE.



FIGS. 3. AND 4.—VIEWS OF ENGINE.

## NEW MOTOR BICYCLE.

A motor bicycle built by the Steffey Mfg. Co., of San Diego, Cal., is one of the novelties in the automobile line recently brought out. It is light in weight, the motor 20 pounds and with attachments 25, so that an ordinary bicycle is strong enough to support the driving mechanism. In fact, the motor, it is said, can be attached to any bicycle with a screw driver. It is good for a 10 per cent. grade, and the pedals are retained to assist on heavier grades.

FIG 5 —THE LOCOMOBILE, STYLE NO. 2.

# Club News and Views.

### Country Club House for the A. C. of A.

The illustration shows a view of the residence at Kingsland Point, the use of which has been given for more than a year, or until March 31, 1901, to the Automobile Club of America for a club house by Mr. John Brisben Walker. The house is about 26 miles from the City Hall, belonged for nearly a century to the Kingsland family, and but recently came into the possession of Mr. Walker. The house is furnished, and the grounds are especially attractive for the heavy grove in which the house stands and the many nooks and interesting historical spots with which the place abounds.

The ride from the city is a pleasant one, and to the various towns along the Hudson. The location is cool in summer, and the cheerful fireside in winter will make it a desirable objective point for a run on the shorter days of the year. As regards the distance and location with reference to the city, it would seem as if no more desirable place could have been chosen, and the club has been especially fortunate in thus receiving a house outside of the city.

THE COUNTRY CLUB HOUSE OF A. C. OF A.

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Some new members have been added to the committee on contests, runs and tours, and as it now stands is composed of the following members: Winslow E. Busby, Whitney Lyon, Albert R. Shattuck, J. C. McCoy, David W. Bishop, Jr., George I. Scott and Albert C. Bostwick, chairman. The membership of the club is growing rapidly, and there are a number of applications before the committee.

### The Belgium Club's Petition.

The Automobile Club of Belgium has addressed a letter to the Automobile Club of France regarding the international contest for the Gordon Bennett cup. The club signifies its intention to enter the race, but asks for a revision of the rules governing the selection of the winner. It proposes that the prize be awarded to the club whose team can show the shortest aggregate time for the distance and not to the club one of whose members succeeds in covering the distance in the shortest time.

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### The Automobile Club of Chicago.

Almost with the inception of the new year begins the Automobile Club of Chicago, recently incorporated by Messrs. J. Ogden Armour, E. Walter Herrick, Samuel Insull, F. K. Pulsifer and Andrew R. Sheriff, who constitute the board of directors for the present year. The objects of the club as set down in the articles of incorporation are "to associate in an organized body persons owning, using or operating, or interested in the use, operation and development of self-propelled vehicles; to promote and facilitate acquaintanceship and social intercourse among such persons; to encourage the development and adoption for use of such vehicles; to formulate and encourage the adoption of uniform rules for the safe use and operation of automobiles in public places; to arrange and manage races between and tours by means of such vehicles, and to exercise all powers incidental to the foregoing."

The home of the club for this year will be at the Calumet Club on Michigan Ave. The officers have not been elected, but Mr. Andrew R. Sheriff is the acting secretary. At the business meeting to be held this month, the election of officers, the constitution and various other matters will be taken up. The men already interested in the club are well-known members of the Calumet and Washington Park clubs, and in a short time the club cannot fail to have a large membership of prominent men who are taking up automobiling.

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### A Good Foundation.

Good roads are necessary to the success of the automobile. The bicycle has given us the sidepath and the automobile will give us the highway. A self-propelled vehicle can never travel on soft alluvium that rain and frequent travel has worked into the condition of the ancient ocean bed nor over the soft clay "that sticketh closer than a brother," and soon brings the tires to elephantine proportions. It is a good road vehicle, and its limit will be the extent of passable roads. Every automobilist should be a good roads' advocate, and should assist in every movement tending toward the improvement of the highway. The U. S. government is doing a good work in the dissemination of information respecting road building and repair. Every encouragement given to this movement helps to lay the foundation for the future success of the automobile.

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### Permits for Central Park.

The more recent permits issued by the Board of Park Commissioners to automobilists for admission to Central Park contain a clause as follows: "To enter upon and pass over the drives of Central Park with an open electric carriage (phaeton), operated by an experienced motorman. Revokable at any time and subject to the rules and regulations of the department. In accepting this permit the holder agrees to exercise the greatest possible care to avoid frightening horses on the drives or bridle paths, or causing any danger or annoyance to the other frequenters of the park."

The permits of Mr. I. L. Rice and Mr. Jefferson Seligman were recently revoked by the president of the board because they used automobiles other than phaetons, and did not always accompany their automobile. Thus Mr. Rice's family used an electric brougham for their ride in the park and this was considered sufficient grounds for cancelling the permit. There promises to be some opposition to the present methods of the board in regard to automobiles.

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The first shipload of American goods for the Paris Exposition has gone via the U. S. auxiliary cruiser Prairie. The cargo was chiefly building material and goods for the government exhibit. The next sailing of this vessel on a similar errand will be about the fifteenth of the present month.

## A Riker Delivery Automobile.

The accompanying illustration shows an electric automobile built for and now being used by Carl H. Schultz in the delivery of mineral and carbonated waters in New York City. As will be noted, it has been built especially for this purpose. Two four-horse-power motors are used, affording sufficient power to carry a load of 2,500 lbs. up any grade about the city. It will travel at a higher speed than the usual heavy wagon, being capable of making eight miles an hour.

The frame is steel, and the wheels wood with three-inch solid rubber tires. The forward wheels are 38 inches in diameter, and the rear wheels 44 inches. The side lights are electric. The total weight, including batteries, is 6,000 lbs. A single charge of the battery gives a radius of 25 miles. A combination voltmeter and ammeter shows the condition of the battery, which is so concealed within the body of the vehicle as to give no indication of its whereabouts. The woodwork is nicely finished and the seat heavily upholstered, giving both comfort and elegance. This electric automobile was built by the Riker Motor Vehicle Co., of Elizabethport, N. J.

## The Hertel Automobile.

An automobile that will undoubtedly meet the ideas and requirements of many persons is shown herewith. The use of bicycle methods in the construction of the frame and wheels gives it an air of strength and durability. It is almost entirely built of metal, which is japanned.

The motor is a gasolene, of two and a half horse-power, using 74 degree store gasolene. It has a water jacket over the piston ring travel. The ignition on starting is by storage battery, but in running a small dynamo furnishes current. The exhaust is muffled and is said to be odorless. The muffler also heats the air going into the carbureter. The motor is mounted over the rear axle and drives the carriage through friction pulleys acting on the driving rims on the rear wheels.

These wheels have a tread of forty-six and a half inches, the forward wheels of thirty-five, and the wheel base is forty-seven inches. The water and gasolene tanks are placed under the seat and will hold a supply for fifty miles. The speed can be raised by the one lever up to twenty miles an hour. The weight of automobile is five hundred and fifty pounds.

The following directions are given for the operation of the carriage:

The first operation is to set gas and air switch on seat in a position which gives the best results. This is soon found out by a little practice.

2. Turn handle on lever one-third down to open admission valve.

3. Move lever slowly forward and backward, holding pawl and handle on lever together until motor is turned twice over the compression.

4. Turn on electric switch.

5. Turn motor another quick revolution, which will start it if mixture is right. By some practice it is possible to start motor with one move of the lever, especially after motor has been running for some time.

After motor is started, it runs with switch turned off, as the dynamo furnishes the current.

To start the wagon, it is advisable to use the low gear, which is done by pushing the foot lever forward before throwing hand lever forward, which engages the pulleys to the friction rings on the rear wheel.

Changing the gear or making sharp turns, it is advisable to reduce speed of motor by turning handle, and to release pulleys a little by means of lever.

Going up steep grades, some pressure on lever may be required. Going down steep grades, use low gear and keep pulleys engaged, which saves the wear of the brake and keeps the carriage all the time under perfect control.

To stop the wagon, simply pull lever back, which disengages pulleys and applies the brakes. To stop motor, turn handle on lever up. Be sure to have electric switch turned off when wagon is not in use; and it is advisable to turn air switch over to one side, in order to save fuel. Disconnect wire from battery at switch end. The oil cups should not be changed after they are once set right, except for long runs should be opened two turns, then back for ordinary running. If the pistons are in a forward position, they will prevent any waste of oil and insure lubricating of cross-heads and wrist-pins.

It is built by the Oakman Motor Vehicle Co., of Greenfield, Mass.

A RIKER DELIVERY AUTOMOBILE.

THE HERTEL AUTOMOBILE.

## Maintain the Battery.

What should be a very important fact to buyers of storage batteries is the matter of maintenance of the batteries, which is done for a period of years by Sipe & Sigler, Cleveland, Ohio, the manufacturers of the Willard storage battery. They make a specialty of maintaining for a period of years at a specified sum per year all Willard automobile batteries in whomsoever make of carriage they may be used. These batteries may be fully charged in forty-five minutes.

The Automobile Club of America has adopted and registered the cable address "Automerica."

## Collecting Mail by Automobile.

Last month a test was made at Cleveland of an automobile for the collection of mail. The test was authorized by the Postmaster General, and the automobile was furnished for the purpose by the Winton Motor Vehicle Co. of the above city. The route selected was what is known as the Euclid district, in which there are both paved and unpaved streets. The distance traveled is twenty-two miles and there are one hundred and twenty-six boxes, one hundred and one letter and twenty-five paper and parcel boxes. The time ordinarily required is six hours for making the collections with horse and wagon.

On this morning there was a mild blizzard on hand which had brought snow during the previous night and morning. The condition of the roads is best shown in the accompanying illustration from a photograph taken on that morning. The route was covered in two hours and twenty-six minutes and on a pleasanter day the collector thought the time could be reduced. This result shows a saving of more than fifty per cent. in the time. The wagon used was, as shown, of the light delivery type. The wagon left the post-office at 12.20 and arrived on its return at 2:47. It could then have started out on another route, while with the horse vehicles they usually return to the stables. A full report is to be made of this test to the post-office authorities and from the expressions of Postmaster Dewstoc it is believed that the report will be a favorable one.

COLLECTING MAIL BY AUTOMOBILE.

## The Pan-American Exposition.

The plans are gradually being consummated at Buffalo for the Pan-American exposition, the first of the twentieth century. Although somewhat overshadowed at the present time by the exposition of this year across the water, it will follow with the greater prominence for having been lost sight of for the time being.

Buffalo, which boasts of its hundreds of miles of asphalt pavement, will be the grand rendezvous during that year for the automobilist. With the fine streets and good roads stretching in every direction, the location is most excellent for automobiles. In the exposition itself, it will form the most attractive part of the display.

The machinery and transportation exhibits are to be grouped under one large building, according to the present plan. This building is 500 feet long and 350 feet wide, and the style of architecture is Spanish renaissance.

## Electric Automobiles.

By Frederick S. Chapman.

For certain well-defined purposes which have suggested themselves to many automobile builders, storage battery propulsion possesses advantages which seem to place it far ahead of other available means of mechanical traction. It is unfortunate that at present a considerable majority of the general public still insist on placing all self-propelled vehicles in one class labeled "motor carriage," irrespective of whether they are designed for heavy trucking, or for light dry-goods delivery service, or for interstate touring, or for city park driving. Of course, however, it is recognized by those who have made any study of the subject that the demand for self-propelled vehicles is going to provide for a great many different classes, and it is highly probable that several varieties of motive powers will be found useful, each in its own particular field. Among the purposes to which the electrically-driven vehicle appears to-day to be pre-eminently adapted, may be named public cab service, driving for private business and pleasure, physicians' use in city and country, the delivery of merchandise, and omnibus service where the routes covered make it possible to return after no very long period to a central point for recharging the battery or replacing it with a fresh one. Many other conditions may be best met by the electric vehicle; and, in fact, there are some circumstances, where economy and convenience are both to be consulted under which its use seems almost imperative.

As compared with other varieties of self-propelled vehicles, there are several obvious advantages possessed by the electric vehicle which present themselves readily and require no demonstration. Among these are notably the absence of the odor, noise and vibration which are frequently present in vehicles driven by hydro-carbon motors, and tend to render their use objectionable in crowded city streets. The visible steam exhaust and constant boiler attention required from drivers of steam carriages are also absent in the electric vehicle. The electric vehicle is extremely clean and simple of construction.

Perhaps, however, the considerations which argue most strongly for storage battery traction when applied to vehicles intended for working under the special conditions mentioned above are its superiority of control and almost perfect flexibility under widely varying road requirements. The functions of manipulation and complete control under all possible conditions may be reduced to a minimum of four simple processes which have to do exclusively with the operation of a controller handle, a steering lever, a reversing lever and a brake pedal. Simplicity more complete than this could hardly be expected from an automobile vehicle, or any other.

The electric vehicle also possesses the quality, by virtue of the inherent properties of the electric motor driving it, of adapting itself automatically and without especial attention to all ordinary road conditions encountered, whether of grade or weather. In surmounting a hill there is no occasion under ordinary circumstances for an additional and perhaps somewhat complicated low-speed gear apparatus, nor is the attention of the operator required for the manipulation of any ignition regulating device, or other devices frequently called into play upon carriages moved by other motive powers than the electric one. In a word, it is largely the ability possessed by the electric motor to furnish the necessary power to propel a carriage over a level stretch of asphalt or up a 15 per cent. grade without the motion of a lever in passing from one to the other, which commends it for city and suburban use.

The demonstrated facts mentioned above have been of weight in inducing American manufacturers to take up as largely as they have done the production of electric vehicles. One more consideration has had its influence here, and that is that storage battery cabs and omnibuses for public service meet a demand so widespread that they can be made to give almost immediately a fair return on the money invested in them.

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An automobile and cycle exhibition is to be held at Brussels, Belgium, from March 31 to April 8, next.

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## 1899.

The year that is just past has brought about a wonderful advance in the automobile industry. The number of prominent engineers and inventors who have taken up the problems connected therewith, the amount of capital invested, the old shops made new for purposes of manufacture, and the general public interest that has been shown, have combined to give the industry, in a very short time, an important position among the commercial enterprises of this country. The year has seemed favorable for floating great industrial schemes with large capitalization, and the number of "would-be" automobile combines with a capitalization of seven or more figures that have not been realized, has made the industry appear light and unsubstantial. These, however, have been but flurries accompanying the real movement. In the development of the various types of automobiles and in the preparation for their manufacture large sums have been invested. The American builders of electric automobiles have made a reputation for themselves throughout the world; the gasolene automobile has been greatly improved in accordance with characteristic American ideas, and the steam carriage has received a great deal of attention with a corresponding amount of success. In the building of light steam carriages America already leads the world. In the matter of events, competitive trials of speed, etc., America has not been prominent.

## An Important Fact

The communication in this issue from Mr. Charles A. Brown, of Brown & Clegg, the well-known patent attorneys, of Chicago, calls attention to an important fact in connection with the automobile industry; the freedom inventors and designers have in the construction of the vehicle and its motive power. While many patents have been granted on different parts there is no fundamental patent which gives to one a monopoly and deprives others of every incentive to work for its improvement. The importance of this fact is well illustrated by the case cited, and the impetus that was given the industry by the expiration of the fundamental patents shows how this retarded its advancement.

## The Automobile and Street Railway.

In a paper recently read before the Automobile Club of Great Britain, Mr. R. E. B. Crompton said in conclusion as follows: "Now that we can have good wood pavements, and that automobilism will soon become the rule instead of the exception, the tramway is an anachronism. The tramway is all very well for a new country where the roads are bad, but when a town like London has perfected roads, tramways should not be tolerated. I think all automobolists ought to combine to educate the public and the local authorities on this matter. The traffic can be carried better, safer and cheaper by automobile vehicles on a smooth asphalt road than on a tramway, whether the latter be electrical driven or not."

This is certainly a most promising view of the future of the automobile omnibus. In London where the omnibus is a fixture and where the automobile earlier received attention, Mr. Crampton has been in a position to study the conditions and judge the future possibilities of that city. America is the birth-place of the electric railway, and here it has reached its greatest development. That it will repeat the history of the cable road is hardly to be expected, but its field of usefulness will be curtailed by the automobile. For such lines as are mentioned above, where narrow streets and congested traffic do not admit of a railway, the automobile omnibus will be successful. There is also another place in which the automobile will supplant the trolley, and that is where the traffic is light, not sufficient to warrant the heavy investment of an electric railway system.

## The Automobile and the Horse.

The opposition to the automobile because it frightens horses begins to look childish. The same was said of the steam railroad, but horses have become accustomed to them. It was also said of the electric street car, but no one thinks of it now. So it will be with the automobile; horses will soon become accustomed to them. The horse owner, who educates his horse, does not have runaways. Automobilists who have toured through the country report that but a small percentage of horses show any signs of uneasiness at the approaching automobile, notwithstanding the careless manner in which the majority of them are driven. Caution should always be exercised by the automobilist, but the responsibility does not rest entirely with him. The horse owner has this problem before him, and he should meet it fairly by making his horse acquainted as soon as possible with the horseless vehicle.

## Our Parks.

The position the park commissioners have taken regarding the admission of automobiles to Central Park, New York, seems to be based not on any law or ordinance, but upon the pleasure of the commissioners. If such authority is granted the commissioners under present laws, the laws should be changed, and at once. It seems absurd that a favored few should be given a privilege and those required to conform to regulations going into such details as the style of carriage, its means of propulsion, that the holder of the permit must do his own driving, etc. Why a phaeton and not a light runabout; why a phaeton and not a brougham in rough weather; and is the privilege to be snatched away at the slightest infraction of any part of the rules? It is not only discrimination, but opposition to the automobile. A horse-drawn pleasure carriage, whether old or new, open or closed, public or private, passes unchallenged through the park. The horse is the mark that gives free access; without it, admission is denied. In other words, the park is for the horse and not for

the people. Those miles of roadway, kept in repair and in suitable condition by a numerous band of workmen, are for the benefit of the horse, where he can take his exercise and disport himself before his admirers.

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**The Automobile on Crowded Streets.**

The appearance of the automobile omnibus on Fifth Ave., New York, as illustrated in the December number of THE AUTOMOBILE, shows what the automobile is capable of doing on crowded streets. This compact form of vehicle, but a little more than one half the length of the horses and omnibus, which is used on this line, with a greater freedom of movement, an ability to stop and start quickly and speed at all times under absolute control, will more than double the capacity of a street. The matter is already receiving attention of shutting out of Fifth Ave. all heavy trucks and reserving the street to pleasure vehicles. Were automobiles in common use, the street would more than accommodate all the traffic that comes to it. In the next few years we will see greater speeds on our streets and roads, and we will become accustomed to it, just as we have become accustomed to the rapid transit of the electric railway car. This will help to relieve the congestion of traffic which would otherwise increase to such an extent as to necessitate a change in business methods.

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**Rules of the Road.**

It would seem, at first, as if common sense was all the rule required on the public road, whether it be for a pedestrian, a rider or driver of horse or automobile. Yet there are many rules that have been so closely followed from time out of memory that we have ceased to look upon them as rules. There are others that are not universally followed, because the necessity for uniformity has not been recognized up to the present time. One of such rules is: In passing another going in the same direction, turn to the left. It is an important rule and becomes more important as greater speeds are obtained on the road. The one who keeps to the right of the road, passes others to the right or left according to the direction they are going, and exercises an ordinary amount of common sense, will have little trouble and few damage suits to defend. As regards speed, it is the time and place that regulates it rather than any fixed rule. Consideration for the rights of others is always necessary. A speed allowable on a country road with few travelers and only an occasional intersecting road, would not be permissible in the more thickly settled sections of our towns and cities. While ordinances in some cities specify a maximum speed of eight miles an hour, in other places fifteen to eighteen is permitted. In these places the control the driver has over the vehicle is of greater importance than the speed, as was pointed out in a recent paper, an abstract of which will be found in another column. It is a well-known fact that a bicycle or automobile equipped with modern brakes is able to stop much quicker than a horse-drawn vehicle. As the stopping qualities of vehicles improve, speeds will increase, and as a result the rules of the road must be more closely followed.

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**Good Roads.**

Wherever good roads are to be found there the people are well-to-do and prosperous. Good roads are the foundation of civilization. Communication is education; activity, success. In many sections where roads are passable only during certain periods of the year, business thrives for that time, and during the remainder of the year the people have the isolation of a savage race. In rural sections the market is accessible to farm products only at such times as the roads are passable to heavy loads. The activities of a people keep pace with their means of communication. Their commercial success depends on the facilities for reaching the market. Their social and educational success depends on the ease with which the people can mingle and exchange ideas. Civilization improves as the various departments of human activity are brought to a successful issue. Our railroads have become great trunk lines, skipping the intermediate points and benefiting the outlying sections only through the link that connects them with the chief points on the through line. This link is wholly or in part the public highway. The railroads have been brought to a position of excellence, while the common roads belong to a past century through the indifference of the people that would receive the greatest benefit therefrom.

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**The Diversified Use of the Automobile.**

It is interesting to note the diversified use to which the automobile is already put and for which it is proposed. The light runabout is probably the most popular of all automobiles. To be able to cover any distance, to quickly pass from one point to another, to be able to choose freely the destination, is the desire of nearly every one. Next comes the more luxurious carriage, in which comfort is one of the desirable features. Then, perhaps, the light delivery and many forms of light and heavy trucks for the transportation of goods. In addition to these there are the self-propelled ambulances, hose carts and fire engines, the automobile tractors for hauling canal boats, the automobile tractors for hauling goods, trains, ore, logs, etc., the automobile plow and agriculturist that are used with considerable success in certain sections. These are perhaps but the forerunners of many other uses to which the motor will be put in the near future.

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**The Liverpool Self-Propelled Traffic Association.**

The committee of the Liverpool Self-Propelled Traffic Association, having the matter in charge, has recently submitted a report of the trials held last July and August of heavy automobiles for the transportation of goods. The report covers a hundred and thirty pages and commends such vehicles for the purpose designed. According to the report such wagons are capable of competing advantageously in the transportation of goods, carrying loads from four to six and a half tons; during a day of twelve hours can cover forty miles, besides the collection and delivery of the goods; their starting and stopping powers on grades as steep as one in nine were superior to horse drawn wagons. A number of recommendations are made to the builders, such as greater attention to the minor details, such as bolts, nuts, etc. Coke is considered more economical at the present time for fuel; the speed limit of five miles is considered too low, and four tons tare better than three as at present.

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**The Cycle and Automobile Show.**

Some criticism has been made of the coming cycle and automobile show by those who fear that the automobile will be entirely overshadowed by the bicycle. The bicycle numbers many years of successful history and the automobile, a beginner, should fear nothing from such a joint exhibitor. Those exhibiting bicycles will greatly outnumber the exhibitors of automobiles, but the fact of greater numbers will not lessen the interest that will be taken in the self-propelled vehicles. At the International Cycle Exposition held last month at Paris, the cycle exhibitors were in the minority, the automobiles being more numerous and attracting greater attention. Probably the same will be said of the show another year in this country. If not then, certainly the year following. At the electrical show last spring the number of companies exhibiting automobiles was limited to those making electric vehicles and their number at that time was small. These exhibits occupied a central location and received a great deal of attention. There will always be the objection to a house display of automobiles that it is a dead exhibit. The race or parade has more life and awakens greater enthusiasm.

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Among the evils that recently threatened the English in South Africa was an epidemic among the horses used in the transportation of supplies. When the automobile shall have reached the position to which it is destined no army will be embarrassed through such evils.

## The Speed of Vehicles.

By R. E. B. Crompton.

A traffic at an average rate of ten miles an hour will transport double the number of passengers that could be transported at five miles an hour, but those who are so clamorous to reduce speeds do not apparently see that halving the speed means doubling the number of vehicles required to carry a given amount of traffic, and hence doubling the overcrowding and congestion of the streets. Speed, therefore, is desirable not only as it saves time in the transport of passengers and goods, but in that it reduces the number of vehicles in the streets. The speed of foot passengers and horse-drawn vehicles has in the past been practically limited. A man can walk at four miles an hour, a horse from four to five, and light vehicles can be drawn by a horse trotting at from nine to ten. Hansom cabs and private carriages are frequently driven at twelve miles an hour. None of these rates are called furious driving, and rightly so, as traffic has been safely conducted at these rates for many years. The real measure of safety lies in the distance in which a driver can pull up in case of emergency, such as a person falling in the road, or of a child running suddenly in front of an advancing vehicle. In all cases it will be seen that the real measure of the danger is not the speed of the vehicle, whether horse-drawn of automobile, but in the available controlling power.

I have been at considerable pains to notice the controlling power of a skilled hansom cab driver, and I find that about thirty feet is required in which to stop a hansom cab going at twelve miles an hour, a speed which is not considered furious driving by the police—that is to say, if the road is in ordinary winter condition, either on macadam, wood or asphalt. On a dry road in perfect condition it is probable that this distance might be reduced to twenty-five feet, but a properly braked automobile driven at the same speed can be pulled up to a certainty within fifteen feet, and a cycle fitted with modern brakes in ten feet. It is therefore certain that future regulations, instead of restricting the speed, ought to prescribe the distance within which the vehicle can be pulled up in case of an emergency. It would follow on this that the police responsible for the regulation of the traffic could, if they considered that a driver is driving furiously, test it by signaling him to stop, and if he does not stop within the prescribed limit, breach of regulation could then be easily proved against the driver. In this way, much of the hard swearing and ridiculous statements made by suburban and country police and others as to the speeds of automobiles and cyclists would be avoided. As the rate of speed would not be considered furious, provided it was shown that the driver was capable of pulling up within ten feet in a thoroughfare crowded with traffic, whereas in a country road, where he had an unobstructed view, and where there is little or no traffic, the speed limit, if any, should be that it should not cause a nuisance by noise, provided that in all cases his brake power be sufficient to enable him to pull up within forty feet. The correct speed for automobilists and cyclists proceding through traffic is a little higher than that of the traffic going the same way. All drivers and cyclists will agree with me that if their speed is less than that of the traffic, the risk of obstructions to traffic and of accidents is far greater than if they are overtaking it. Probably, if experiments were made, it would be found that a motor car can be driven with perfect safety, and with a minimum of obstruction to other traffic, somewhat in excess of twelve miles an hour. As I have shown, reduction of speed keeps the car a longer period in the public streets; logically it increases the obstruction caused by it, and, of course, the same holds good with cycles.

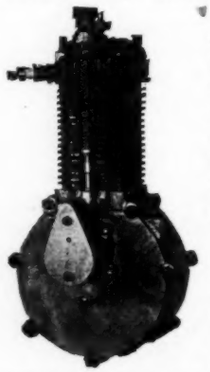
The ignorance of the public on speed questions is astonishing; few people seem to appreciate the difference between average and maximum speed. In traffic, in order to maintain an average speed of ten miles an hour, it is probably necessary at times to pass other vehicles at thirteen or fourteen, and on this point no one seems to be able to interpret the regulations. It appears to be probable that those responsible for the regulations when they fixed the limit in London of twelve miles an hour meant to allow automobiles to be driven at a speed slightly in excess of the ordinary horse-drawn light traffic, and if my interpretation of this is correct, the twelve miles an hour fixed is an average rate. It is a great pity that so much uncertainty exists on this point of the speed that is allowed. I think on the whole we may congratulate ourselves on the very reasonable view on this question taken by the Metropolitan police. They appear to consider it their duty not to interfere with automobilists so long as their cars are thoroughly under control, and are not driven to the danger of others, and this is the proper view to be taken of the situation. They appear to adopt the same attitude as regards cyclists, and it is a thousand pities that their view is not universally adopted by the police in all other towns and country districts.

When I talk of the controlling power that a driver has over his vehicle, I must not confine myself solely to his braking power, but I also refer to the readiness and promptitude with which he can change his direction and swing readily clear of any sudden obstacle. In a horse-drawn vehicle, as Mr. Montagu recently pointed out, there are two brain powers, so to speak, that is to say, that in case of sudden necessity, either for stopping or to swerve, the impression has to reach the brain of the driver, and thence to be conducted by his hands to the brain of the horse, and again through the brain of the horse to his feet, which in turn govern the movement of the vehicle he is drawing. All this takes considerable time. In the case of the cycle or motor vehicle, the brain impression of the driver is acted upon almost instantaneously through his hands, and hence the vehicle is diverted or stopped. The shortness of a motor vehicle as compared with a horse-drawn vehicle permits of extremely rapid, and hence instantaneous, swerving to the right or to the left in order to avoid vehicles or foot passengers.

*Abstract from paper read before the Automobile Club of Great Britain.

## The Maltby Automobile Motor.

The most important part of every automobile, whatever be the force used, is the motor, which gives life to the vehicle. The carriage body, means of steering, etc., while incidentally required, all are subordinate to the central mechanism. Among the motors recently prefected, possessing unique features, is the gasoline motor of the Maltby Automobile Co. of Brooklyn.



THE MALTBY MOTOR.

The first noticeable feature is the great surface area secured by the closely-placed and broad ribs radiating from the explosive chamber. Another important feature, which is followed throughout, is the provision for quickly taking apart the motor and accessories. The side studs connecting cylinder to casing usually pass through the head, and require a considerable time and effort to take off, are so placed that a few turns of the nuts will permit them to be slipped out and the combustion chamber and cylinder removed. The sparking plug can be taken out by hand, without the use of tools. Other parts are as easily open to inspection.

Three different methods of sparking, the "jump spark," "contact" and "rubbing contact" have been developed, and any one can be put on at the option of the purchaser. The sparking is exactly timed, and the speed and power is regulated by the supply of the explosive mixture. Economy in the use of fluid is thereby secured.

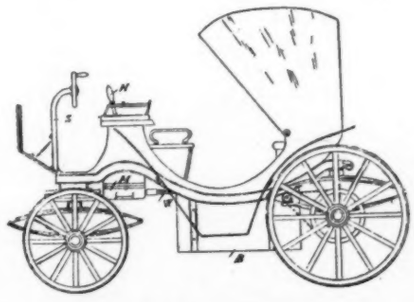
A light motor, weighing about 22 pounds, is being built for bicycles. The use of aluminum in this and the larger automobile motor has enabled the builders to secure lightness without sacrificing the strength. A boulevard stanhope now being built, Mr. Maltby states, will weigh only about 600 pounds. The running gear and carriage body will be handsomely enameled.

The launch motor built by the company is water-jacketed, and contains a number of these improvements. Special motors and automobiles are being constructed to order from plans of the owners.

## The German Automobile Cab.

In the accompanying cut is shown the outlines of the automobile cab which is now used in the German capital. The design of the cab is due largely to the police regulations, which govern every detail almost. It is really but a modification of the horse cab. The motors which drive the rear wheels are placed under the driver's seat near the forward wheels. The power is transmitted through shafts, W, to the sprockets and the chains to the wheels as illustrated. The two motors act independently of each other, but should one motor become disabled, the other can be made to drive the cab. The storage batteries are placed in the box, B, beneath the center of the cab.

The cab weighs about twenty-eight hundred pounds, will accommodate five passengers. Its maximum speed is twelve miles, and its battery will run about twenty miles. Electric and hand brakes are provided. The cabs are reported as being very satisfactory.



THE GERMAN AUTOMOBILE CAB.

## The Canda "Auto-Quadricycle."

The points which the manufacturers claim in regard to the automobile illustrated herewith are its simplicity, ease of management, ease with which its construction is understood, its durability and finally the fact that all parts are interchangeable and easily accessible for inspection, adjustment or repairs. It carries two persons tandem. The one in front is mounted upon a seat like that of a buggy, while the other sits upon a saddle in the rear.

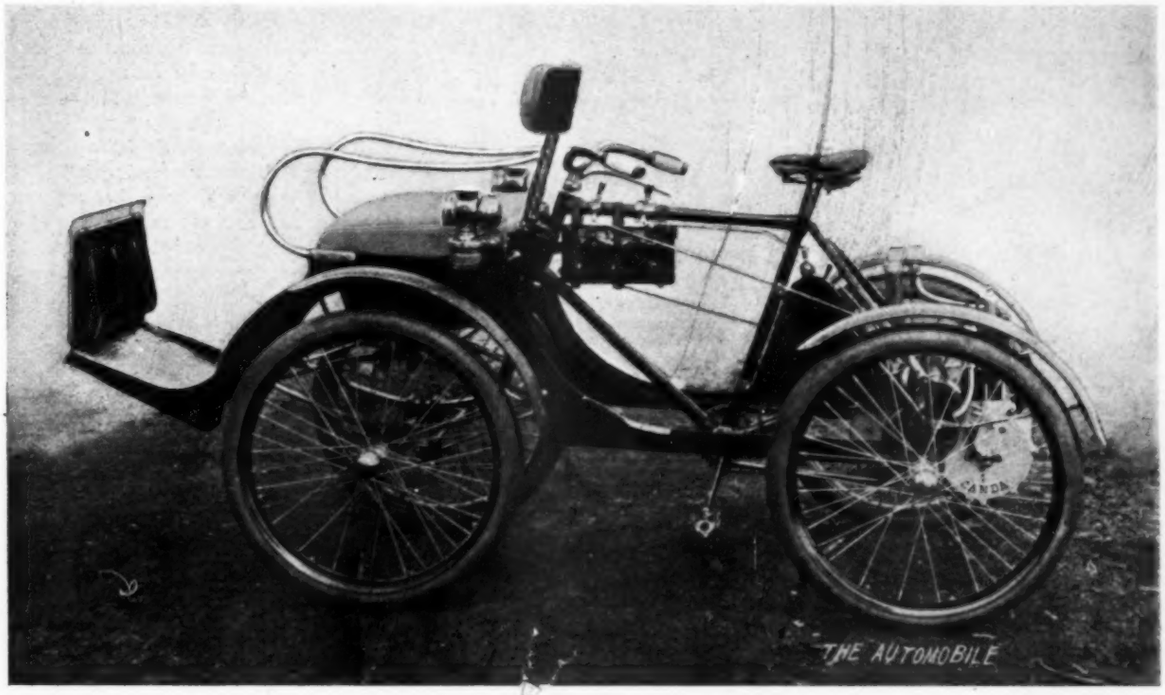
The central portion of the frame follows closely standard bicycle lines. At the level of the axles and outside of this is another frame of light angle-iron. The two frames are connected by braces which form a very stiff, as well as strong, structure. The "auto-quadricycle" is 46 inches from center to center of the axle; it "tracks" 36 inches, is 7 feet 6 inches long and 42 inches wide. The weight of the machine complete, ready for service, is 350 pounds.

The motive power is a gasoline engine mounted over the rear axle. It has a vertical cylinder, and when running at normal speed will develop 1¾ horse power. The engine uses the Otto four-stroke or two-revolution cycle.

The speed of the machine has a range of from 2½ to 25 miles an hour. It may be added that the control by the simple manipulation of two regulating levers is complete between the speeds mentioned. A band brake on the rear axle is controlled by the lever beneath the handle bar. When applied with full force the machine may be brought to a standstill within a few feet. One point may be noted in connection with the engine; that is, that the gearing is entirely enclosed by very light aluminum cases which are dust tight.

The steering is accomplished by a bicycle handle bar in the usual manner, which is connected with a set of rods to the front wheels. These front wheels are mounted independently and revolve about a point just inside the hubs. This gives as great a turning power as the ordinary "fifth wheel" arrangement. It has a great advantage in stability and also in ease of driving. With the arrangement shown the vehicle is perpectly stable with wheels at any angle. The finish of the machine is nickel for all of the smooth and bright parts. The other portions of the machine, such as the frame, fenders, gasoline tank, etc., are enameled.

The price at the factory is $485, exclusive of lamps and bells. It is built by the Canda Manufacturing Co., whose office and factory are at Canda on the Sound Shore branch of the Central R. R. of New Jersey, the post office address being Carteret, N. J.




THE CANDA "AUTO-QUADRICYCLE."

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## From Tricycle to Quadricycle.

Means for changing the Ariel tricycle to a quadricycle were described in a recent number of the Motor-Car. The attachment is very simple, being an open upholstered seat mounted on two wheels. The forward wheel of the tricycle is removed, the arms extending from under the forward carriage are fastened to the rear axle sleeve. Two braces run from these arms and are fastened by a clip and bolt to the lower forward tube of the frame just back of the forks. The three fastenings are all that are necessary.

The forward seat, as will be noted from the diagram, is mounted on a set of springs and the little dash protects the rider. The steering and control of the vehicle is effected by the rear rider. The extreme length of this quadricycle is seven feet seven and width three feet five inches.

# The Automobile—Its Details, Management and Repair.

CONDUCTED BY GEORGE T. HANCHETT.

## THE WORKING RADII OF STEAM VEHICLES.

Though the steam vehicle has much to recommend it, and for certain work is unexcelled, yet it has its limitations, and not the least of these is its short working radius, shorter, indeed, than that of the gasoline and electric vehicle in many cases.

If we define working radius as the maximum distance that a vehicle can run without stopping for either gasoline, water or electricity, we shall find the average steam vehicle at a distinct disadvantage. Let us assume a vehicle weighing, with passengers, 800 pounds. To drive this vehicle at the rate of 18 miles an hour over average roads will acquire about 1½ brake-horse power. We cannot hope for a steam economy better than 50 pounds per horse power per hour, and in many cases the steam consumption will reach double that figure with the simple slide valve engines which are used on such vehicles. Taking 60 lbs. as a representative value, we shall be using 90 lbs. of water per hour, and two hours of such running will exhaust any water tank which can conveniently be installed on such a vehicle. As a matter of fact, steam vehicles of this class often have to take in water every 20 miles, from which may be inferred a steam economy of about 80 lbs. per horse power per hour. Such a vehicle would require for a 100-mile run about 666 lbs. of water, which, added to 800 lbs. of passenger and vehicle, gives a total weight of 1,466 lbs., and it is by no means an impossible task to construct an electric vehicle which would duplicate the performance at a weight but little greater than this figure.

Of course we all know that water is cheap and easy to find anywhere, and further, that it is not likely one would often want to run more than 20 to 25 miles without a stop, but that is no reason why we should give credence to claims of enormous radii for steam vehicles which have been industriously circulated, and which seem to have gained currency.

## STEAM AUTOMOBILE FEED WATER.

A precaution which should receive attention when working with steam vehicles is the quality of water used. The boiler for a steam vehicle evaporates a great deal of water in its lifetime, and often receives this water from a score of different sources. The water may be heavily laden with salts of lime or other scale-bearing impurities, and scale on an automobile boiler is a very serious matter because of the high temperatures at which such boilers are usually worked. To those who are unacquainted with scale, it may be stated that impure water will frequently deposit solid material on the shell of the boiler and the intense heat will bake it on in a hard crust which requires for its removal a hammer and cold chisel. This scale not only prevents the heat from reaching and evaporating the water, but it also allows the plates of the boiler to become very hot, in fact so hot that they may be severely burned or perhaps heated till they are so soft that the steam pressure easily bursts them. It is therefore necessary for the user of every steam vehicle to be careful as to the water that he selects for boiler use. Rain water is the best natural water, if it can be had. Clear surface water, such as will be found in brooks or rivers, is perhaps next best. Well water should be used only as a last resort, and of coures turbid water, which can be seen to be full of impurities, should never be used at all.

As an added precaution, the boiler should be thoroughly flushed out with clean water every three or four trips, so as to wash out any scale which may have lodged before it has a chance to bake on hard. Scale is a great trouble in the manipulation of stationary boilers. There are many devices used to avoid it, and to a certain extent it is removable, because the boiler is large enough to be entered, and the objectionable material dislodged. In an automobile boiler, however, a heavy scale solidly deposited means certainly a renewal of some of the parts, and possibly a new boiler. There are many compounds which are advertised to avoid scale, but there is no general cure all; that is to say, one which will prevent scale of any kind from forming on the shell of the boiler, and some of the remedies are actually injurious to the shell. It is possible to obtain a compound which is a fairly good preventative in the case of any one feed water, but where the character of the feed water varies as is the case with an automobile boiler, dependence should be placed on frequent blowing off and washing out of the boiler and careful selection of the feed water in the first place.

## ELECTRIC AUTOMOBILE TROUBLES.

While it is not necessary to be an electrician to operate an electrically-driven vehicle, it is of great advantage to know what to do when certain troubles occur.

Let us consider first a single motor equipment provided with a battery which is connected in different ways for the various speeds. Suppose an attempt is made to start, and the vehicle does not respond and the ammeter shows no indication. This almost invariably means open circuit; that is to say, the path for the electricity from the batteries to the motors is not closed. Referring to the accompanying diagram we may find open circuits at any of the following points:

A. The battery contacts. They may be and often are so badly corroded as to prevent the necessary metal to metal contact.

B. The controller. A connection may be loose or the fingers may not make contact.

C. The running plug may sometimes be out or not making proper contact.

D. The motor brushes. May have dropped out or the tension may be so weak that they do not make contact.

E. The emergency switch may be open.

Leave the controller till the last. It is but a moment to inspect the other joints and to discover the trouble in them after an hour's fussing with the controller is clearly a waste of time.

If the carriage operates at any of the speeds and fails to operate on the others, the ammeter needle falling to zero, the trouble is almost certainly in the controller. The contact fingers that are brought in play at the inoperative speeds should be inspected. Often a screw adjustment or a rub with a piece of emery cloth will correct the difficulty.

If the motor tries to start, but the current is not sufficient, as shown by the ammeter, poor contact or weak battery may be suspected. Discharged battery will be betrayed by a low voltmeter indication, but if the voltmeter registers the normal amount, poor contact should be sought. Any contacts which are part of the electric circuit, such as binding posts, brushes, switch jaws or controller fingers must be bright metal to metal contacts. If they are dirty or corroded the contact may be so bad that the flow of current is seriously reduced or interrupted altogether.

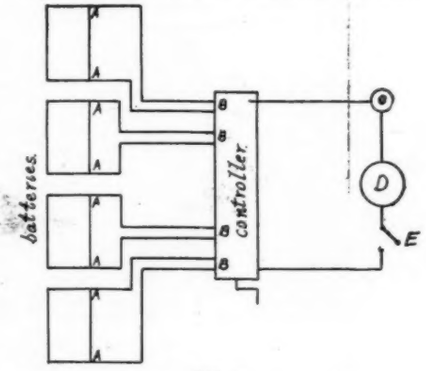


FIG. 1.

## IMPROPER CONNECTIONS.

Sometimes the absence of ampere indication and no motion of the vehicle points to a very serious trouble, namely, the improper connection of the batteries. This will be shown by heavy sparks at the controller; in fact, heavy sparks at the controller, absence of ammeter indications and refusal of the vehicle to move, could only be caused by one other difficulty than this, which will be discussed further on.

When the battery is not properly con-

nected, the motion of the controller causes the sections of battery to exchange current between themselves at a ruinous rate. The terminals of the cells and those to which they should be connected ought to be plainly marked, or, better still, so constructed that it is impossible to go wrong. If the trouble just cited is the fact, one or more sets of terminals of the cells will be found to be connected to the wrong wires.

If the vehicle fails to move and the flow of current as indicated by the ammeter is enormous, shut off the power at once. Serious damage may ensue if this is not done. Then look to see if:

1. The brakes are on.
2. The vehicle is stalled or blocked.
3. The gears are free and there is no obstacle between the teeth.

If the motor makes a noticeable attempt

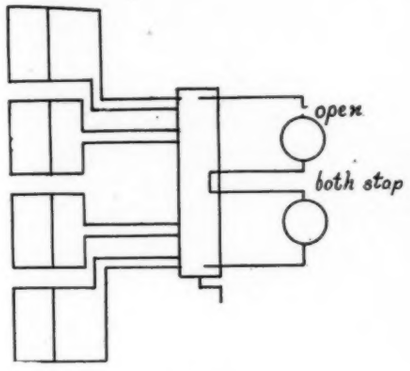


FIG. 2.

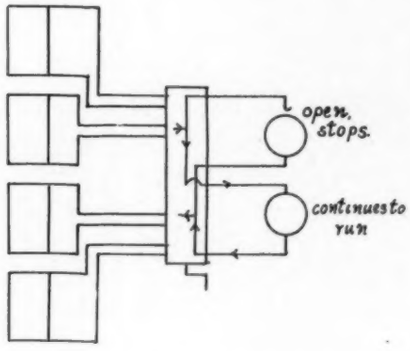


FIG. 3.

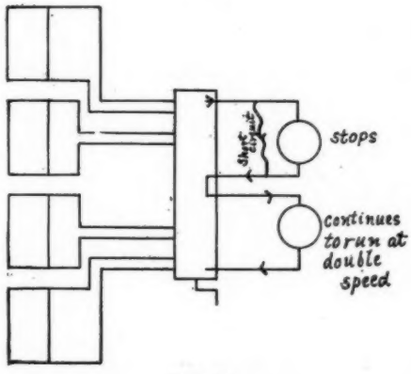


FIG. 4.

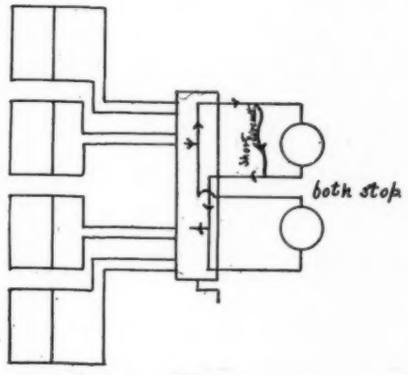


FIG. 5.

to move the trouble is probably something of this mechanical nature.

### SHORT CIRCUITS.

If, however, large current is indicated and the motor remains absolutely inert, the trouble is electrical, and the inference is that the current does not go through the motor at all. Lift one of the motor brushes and try the vehicle again. If the large current is still indicated, the inference becomes a certainty. This trouble is known as short circuit, that is to say, a spurious path for the current which deflects it out of the motor. In the controller may be sought:

1. Foreign pieces of metal making contact between portions of the electrical circuit.
2. Loose fingers which may make contact with wrong parts of the controller or with each other.
3. Dirt between the fingers or contacts.
4. Breaks in the insulation permitting the wires to make contact with adjacent metal or with each other.

If the controller appears to be all right, look in the motor for:

1. Broken insulation, allowing the bare wires to touch the frame or each other.
2. Dirt between contacts or between live metal and the motor frame.
3. Foreign materials bridging contacts.

In such a case it is sometimes of assistance to turn on the current for an instant. The defective place may betray its locality by a smoke or spark.

If, when the brush is lifted, and the vehicle tried, the excessive current indication disappears, there are but two electrical troubles that are possible:

1. The magnet coils of the motor may be short circuited.
2. The ammeter may not be reading correctly.

The latter trouble is least likely; the former should be sought first.

A series motor with a short circuited magnet coil will call for a large current but will do nothing with it. Therefore, examine the magnet coil terminals for troubles of this nature.

A short circuit may exist even if the ammeter does not indicate it. In such a case it is usually found in the controller, which sparks heavily when operated, although the vehicle does not move. This combination of phenomena also indicates improper connection of the batteries, as has been previously explained.

An excessive call for current is accompanied with a drop in the voltmeter indication.

With a two-motor equipment the difficulties that may arise differ but little. A few which are peculiar to this type may be mentioned. Such motors are sometimes run in two ways. The first notch connects the motors in series, as shown in Fig. 2, while the higher speed notches connect the motor in parallel, as shown in Fig. 3. If one of the motors open circuits on a series notch, the vehicle stops, for the entire motive circuit is broken. If it open circuits on a parallel notch, that motor stops and the other with its circuit to the batteries intact continues to run and may cause the vehicle to make some abrupt and unexpected turns. If either of the motors gets short circuited, the exact converse takes place. If the accident occurs on a series notch the unimpaired motor continues to run, and, it may be added, at nearly double its previous speed. It it occurs on a parallel notch a short circuit on one motor constitutes a short circuit on the other also, and if the short circuit is sufficiently severe both motors will stop, even though an enormous current may be drawn from the batteries.

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## Foreign Notes.

Several London newspapers have found automobiles a great advantage in securing a quick delivery of their papers. The present war has increased their circulation, but the added papers have not delayed the automobiles in their trips to outlying parts of the city.

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So successful has been the operation of the automobile hose cart used for some months by the fire department of the city of Paris, that other automobiles have been ordered. In every run in which this cart took part it was the first to reach the fire. It was built after plans by the chief engineer of the department.

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The Chinese ambassador to England recently visited the automobile factories at Coventry, and on his return had this to say: "One can scarcely realize the great future before the automobile trade without paying a visit to one of the factories. The great advantage of the motor car is that there are no horses to put up. It can have the speed of a railway carriage, yet it needs not to confine itself to a track laid down beforehand. It demands, further, the same amount of engineering skill to build a motor car as it does to build a battleship. The service rendered by the motor car to the field gun in time of war, as well as in the collection of mails in time of peace, are simply invaluable, and I have no doubt when all our roads are restored these vehicles will be introduced into the far East.

### The Benz Automobile.

The automobile illustrated herewith is one of a number exhibited by Benz & Co. of Mannheim, Germany, at the recent automobile show at Berlin. It is driven by a gasoline motor, which together with the rest of mechanism is located beneath the seat and the projecting carriage body. The wheels are of the ordinary carriage type, although more substantially constructed.

The motor is a single five horse-power, with three forward and one reversing speeds. It affords accommodation to five persons, with the little seat against the dash. As will be noticed from the illustration, it is a very neat, comfortable-looking carriage.

THE BENZ AUTOMOBILE.

### Motor Attachments for Row-Boats.

A very ingeniously constructed arrangement for propelling small boats has recently been made by a German firm, Henschel & Co. This is the combination of a gasoline motor and a flexible shaft incased in a steel tube formed so as to carry the shaft over the end of the boat and into the water. The end of the shaft is fitted with a small propeller. Just forward of the propeller on the steel casing is a wing, and in steering the boat the wing and propeller are moved by means of a lever to give the desired direction to the boat. The apparatus is so arranged that it can be placed in any row or sail boat by simply fastening the motor to the frame of the boat.

### General Electric Automobiles.

The accompanying illustration shows several types of the automobiles built by the General Electric Automobile Co. of Philadelphia. The motors are electric, supplied with current from the batteries that, in every case, have been very ingeniously concealed within the body of the vehicle. Both light and heavy carriages are built, and the line now includes runabouts, surreys, broughams, light deliveries, drays and trucks.

The wheels adopted are wood with solid tires. This has been a very popular combination, and gives the carriages a very neat appearance. The usual sizes of wheels are 33 and 38 inches respectively. The batteries have a capacity from 25 to 35 miles, depending, of course, on the grades and conditions of the road. The speed can be varied up to eighteen miles per hour. One of the details of construction that is interesting is the spring suspension of the motors. The axles are connected by two reaches and coil springs are placed between these and the motor-supporting bar. This method is generally used in street railway work, and should prove equally if not more beneficial in automobile work.

### New Automobile Cab Companies.

The success of the automobile cab has given encouragement to the organization of several new companies in our large cities. The Woods Motor Cab Co. is to put twenty-five public cabs in service on the streets of Chicago immediately. These cabs are to be finished in the finest manner possible and will possess several novel features. Another company, bearing the same name, is to operate in Buffalo, placing a similar line of cabs in service there.

### Battery Pointers.

By Sipe & Sigler.

On receipt of battery charge to 2.6 volts per cell at the eight-hour rate.

Be sure that the electrolyte covers the plates at all times and in all cells.

Always open carriage body while charging the battery.

Never light a match near the battery while charging.

Never spark the battery while charging.

Always recharge promptly after using the carriage.

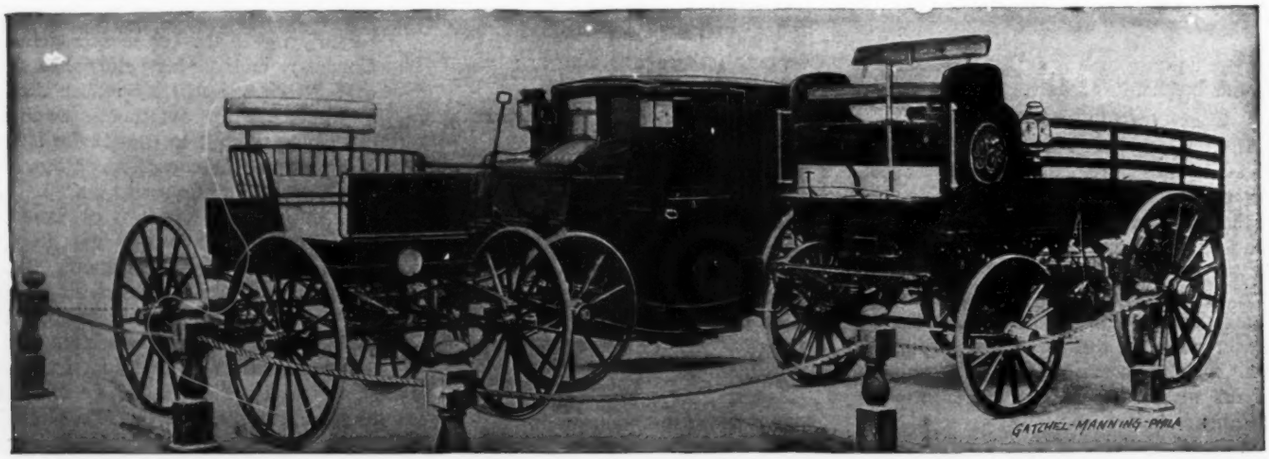
Avoid heating the cells in charging.

Do not charge beyond 2.6 volts per cell at the eight-hour rate.

Overcharge for twelve hours at the low rate once each month.

Replenish electrolyte for loss in ordinary use with 10 parts water and one part sulphuric acid. When loss is due to spilling in shipment use four parts water and one part sulphuric acid.

Handle trays carefully—a short drop may break a cell.




GENERAL ELECTRIC AUTOMOBILES.

## A Plea For an Automobile Fauna.

By Hayden Carruth.

The automobile wave which is passing over the country has astonished even the most hardy prophet, rich in experience of the bicycle inundation. It is not, perhaps, too much to say that at present everything points to the speedy coming of the time when automobiles will have supplanted the horse-drawn vehicle almost to the extent that the railroad car has taken the place of the stage coach.

A change of this magnitude cannot, of course, take place without attracting the attention of the working philosopher. No aspect of the case is receiving his thoughtful consideration more than the blow which it administers to the horse, already hard hit by the bicycle and the trolley car. It is noticed in the output of some of these philosophic laborers that the passing of the horse is deplored, the idea being put forward with the usual professional eye on basic principles, that the severance of man from the noble animal is going to have a bad effect on character, and so forth. No amount of association, they argue, with the mildly choo-chooing automobile can do so much for a man as going about with the noble horse, an animal, it may be observed, liable at any moment to kick your hat off or to shy at a harmless stationary policeman.

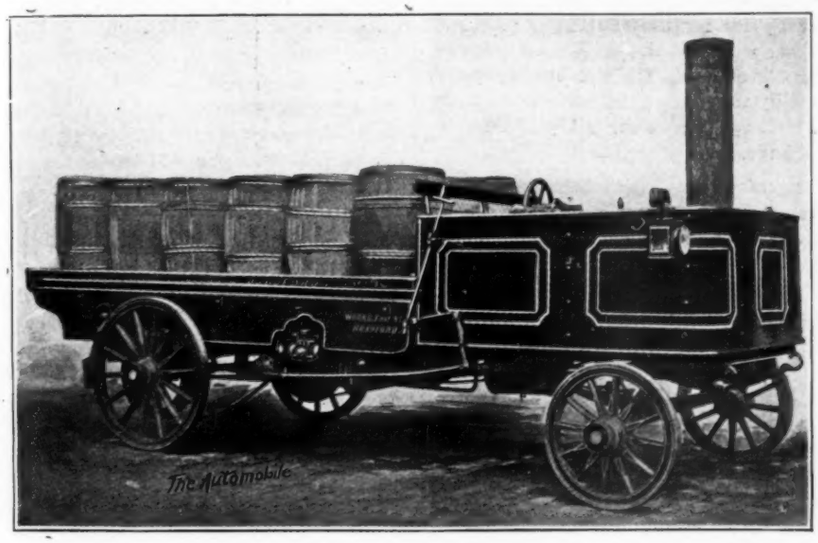
It may be permitted us to doubt the entire soundness of such philosophic deductions, even when they bear the union label. What, after all, is the horse, and is man uplifted by him?—except, of course, when the intelligent animal elevates him with his volcanic rear hoofs. The horse has certainly made much progress since the time he was trotting about no bigger than a fox, and with several toes on each foot; but as man at that period still awaited the daring inventor who should first point out the advantages of the hickory club over one's own jaws in seizing one's prey, it can readily be seen that the horse has not advanced so much as we have.

It seems as if organized society could spare the horse. If all the tales told of the horse by the writers of children's stories would permit themselves to be believed, no doubt it would be hard to make out a case against him, ranging as they do from his opening the barn door with his teeth to his breaking into a telegraph office and sending a dispatch with his prehensile nose; but such is not the case.

It is to be hoped, by the way, that however sweeping the invasion of automobiles may become, that a few horses may at least be retained for literary purposes; it will be exceedingly difficult to lend versimilitude to the scene of an electric brougham standing over its disabled master, neighing loudly for assistance, or of a gasoline roadwagon snorting off to the nearest justice of the peace because its driver is in controversy with a footpad.

Instead of deploring the passing away of the horse let us pray further to be emancipated from the tyranny of the crude domestic animal. We have made great progress; the ox is gone; the cow, it is said, is becoming extinct—the creak of the substituted pump is heard in the workshop of every humorist in the land; the hen, judging from the condition of her best-known product as it manifests itself in our markets, has been banished to a clime many, many miles distant; there remains the dog alone to drag us down.

Let us have an automobile dog—a dog made of iron and things, compact and nickel-plated to guard against rust, and operated by a small naphtha engine; with two barks, one the deep, musical bay of the poet to welcome his home-coming master, and another, harsh and raucous as the roar of a seven-headed dragon, for the tramp. The new dog shall also have a bite to go with his bark. Then, with a touch of wag for his tail, adjustable—horizontal for ordinary use and perpendicular when his master lives in a small flat—he shall stand a worthy crown to this wonderful century of invention and progress.—Saturday Evening Post.




A HEAVY ENGLISH AUTOMOBILE.

## A Heavy English Automobile.

A peculiar-looking heavy freight automobile is shown in the accompanying illustration. It was built at Bradford, England, and has been in use several months. Steam is the propelling power generated in a patent flash boiler, coke being used for fuel. The working pressure is two hundred and fifty pounds. The speed of wagon is either two and a half or five miles an hour. The cost of running is said to be about one cent per ton mile for fuel. It requires an engineer to operate it.

## From the Paris-Ostend Race.

COMPARATIVE TABLE OF SPEEDS.

| | St. Germain to Beauvais 41¾ miles. | | Beauvais to Amiens 38½ miles. | | Amiens to Doullens 18¾ miles. | | Doullens to St. Pol 16½ miles. | | St. Pol to Dunkerque 55½ miles. | | Dunkerque to Ostend 29¾ miles. | | St. Germain to Ostend (whole journey) 201 miles. | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Duration. | Average Miles per hour. | Duration. | Average Miles per hour. | Duration. | Average Miles per hour. | Duration. | Average Miles per hour. | Duration. | Average Miles per hour. | Duration. | Average Miles per hour. | Duration. | Average Miles per hour. |
| SPEED CLASS CARRIAGES— | hrs. min. | | hrs. min. | | hrs. min. | | hrs. min. | | hrs. min. | | hrs. min. | | hrs. min. | |
| Lewgh (16 h.p. Mors) ... | 1 10 | 35·8 | 1 3 | 36·9 | 0 40 | | 0 30 | 33·6 | 2 0 | | 0 48 | | 6 11 | 32.8 |
| Girardot (12 h.p. Daimler) ... | 1 14 | | 1 6 | | 0 40 | | 0 32 | | 1 52 | 29·5 | 0 47 | 38·0 | 6 11 | 32.8 |
| Lemaitre (Peugeot) ... ... | 1 16 | | 1 4 | | 0 37 | | 0 36 | | 2 7 | | 0 52 | | 6 32 | 30.7 |
| Charron (16 h.p. Panhard) ... | 1 24 | | 1 3 | | 0 36 | 31 | 0 31 | | 2 16 | | 0 49 | | 6 39 | 30.2 |
| TOURIST CARRIAGES— | | | | | | | | | | | | | | |
| Creux (10 h.p. Peugeot) ... | 1 43 | | 1 38 | | 1 7 | | 0 48 | | 2 9 | | 1 1 | 29·3 | 8 24 | 23·9 |
| Rolls (8 h.p. Panhard) ... | 1 45 | | 1 34 | 24·7 | 1 32 | | 0 44 | 22·9 | 2 15 | 24·5 | 1 1 | 29·3 | 8 51 | 22·7 |
| Montagu (12 h.p Daimler). Time, supposing he had started with other carriages at 9.30 ... ... ... | — | — | — | — | — | — | — | — | — | — | — | — | 10 44 | 18·7 |
| But as he did not start until 11.45 his actual time was | 1 25 | *29·5 | 1 37 | 24·0 | 1 7 | †16·6 | 0 48 | 21.0 | 2 28 | ‡22·3 | 0 59 | 30·3 | 8 24 | 23·9 |
| SPEED CLASS TRICYCLE— | | | | | | | | | | | | | | |
| Winner: Barss ... ... | 1 11 | 35 3 | 1 7 | 34·7 | 0 40 | 27·9 | 0 33 | 30·5 | 1 51 | 29·8 | 0 45 | 39·7 | 6 7 | 32·8 |

* Mr. Montagu was unable to start from St. Germain until 2 hrs. 10 min. after the others owing to burst water pipe before arriving at starting point.

† Mr. Montagu had to blow up tyre. Mr. Rolls was delayed 45 mins. with burst tyre.

‡ Mr. Montagu was delayed for 12¾ mins. by burst tyre.

The times and averages above stated include time occupied in tyre and all other repairs.

## Here and There.

"If this automobile fad keeps on spreading, about the only place where you'll be able to hear the clatter of horses' hoofs in the near future will be those playhouses where the military drama prevails."—St. Louis Republic.

An automobile congress is proposed to take place from the 9th to the 16th of July, in connection with the Paris Exposition. The officers have been named, and a very interesting programme is being prepared, including such subjects as the history of the automobile industry, tractive forces, transmission gears and other technical questions concerning automobiles.

Gen. Andrews has resigned as president of the Automobile Club of America and as Adjt.-General of the State of New York, the reason given in each case is the press of private business. A successor has not been elected, but Mr. Chamberlin's name has been proposed, and should he consent his election would undoubtedly be unanimous.

M. Loubet, president of the French republic, uses an automobile at his chateau at Rambouillet, and the members of the family of the Czar of Russia are noted automobilists.

An enterprising English firm builds to order houses for automobiles. They are portable houses of light construction, quickly erected at any point, and have a neat-appearing exterior. For a small runabout a house six by eight feet has been designed. The sides are panelled and the interior lined with felt. The floor is raised slightly from the ground, and a hinged board at the door, turned in when the doors are closed, forms an incline to run the automobile in on.

In its last issue for the year that has just closed, the Electrical World and Engineer says: "Automobilism is perhaps the art that has most enlarged the use of electricity during 1899. And yet the work has been largely tentative and experimental. No one familiar with the situation can question for a moment the rapid growth of this industry, not wholly, it may be, on electrical lines, but looking to electricity for some of the best and most profitable developments. It takes time to break away from traditional forms and ideas, but proof positive as automobilism now is of that fact, it is not less evident that the cumulative changes and improvements are bringing about a very rapid advance which, when looked upon from the distance of a few years hence, will then be seen to have been revolutionary."

One hundred and eighteen miles in a day over roads on which five or six inches of snow had fallen the previous night is certainly a very good record for the automobile. This was accomplished last month by Mr. Johnson, secretary of the Automobile Club of Great Britain, who was making a tour over a part of the course laid out for the thousand-mile run of the club which is to take place next spring.

Once upon a time a man saw a bicycle for the first time. "Ah," said he, "I will have one of those when they are improved." Long years elapsed, and when the pneumatic tires and other improvements came he said, "They will be better yet," but when motors came in he said, "this is better, and when they are perfect I will have one." Poor man, he waited patiently for a "perfect" means of travel, but last week he was carried in a horse-drawn hearse to his last resting place. Thus, by waiting for the perfect article, he got nothing. There are many like him.—Exchange.

One of the novelties introduced by a German firm is a roller-bearing driving chain. The roller-bearing is placed within the side plates and decreases the friction and wear on the rivets.

It is reported that the monument to the late M. Levassor, the renowned automobilist, is now being executed. The design is a bas-relief, showing an arch supported by columns, between which Levassor is represented as finishing triumphantly the Paris-Bordeaux race. It will be an adornment to the Porte Maillot, and will be set off by an artistic bit of landscape.

The German war department has recently ordered five motor wagons for transport service. The order was given as the result of trials that were made last fall by the engineers of the department to test the serviceability of the heavy automobiles.

The light bicycle delivery has been a common sight on the streets of many of our cities for several years. It has been popular with hatters, shoe-dealers and others. Something similar but having a gasolene motor for its propulsion has been placed on the market by companies in Great Britain and Germany and will shortly be seen in America. One style of these is so constructed that the parcel box may be removed and a seat put in its place for one or two persons.

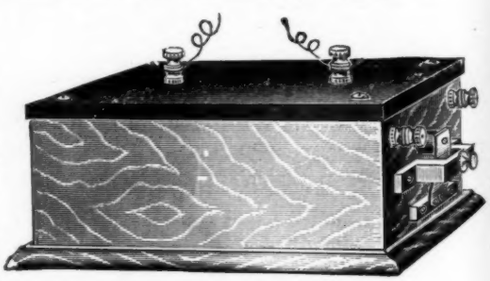
A very destructive fire occurred last month at the construction department of the Electric Vehicle Co., on Forty-second St., New York. Besides a considerable amount of material forty-three automobiles were destroyed. The damage as reported amounts to upwards of a hundred and fifty thousand dollars.

The manager of the Modern Marvel Co., which has been making a tour of Great Britain with a cinemotoscope, conveying the company, apparatus and baggage on an automobile, recently reached Edinburgh and reports having made a journey of 1,426 miles, covering a period of thirteen weeks. During this time they visited seventy-five places, used 140 gallons of "motor car spirit," broke three ignition tubes and had to replace a driving sleeve and a high-speed ring. This automobile was of the wagonette pattern and carried a load of fourteen hundred pounds. The petroleum used averages a trifle less than a gallon to ten miles and the cost of repairs is light, as the vehicle was not new.

The decision of the police commissioners of New York and other cities that the steam automobile came under the law that provides that all steam boilers must be tested and the fitness of the persons in charge of them ascertained, has not proved such a bugbear as some persons anticipated. Among those who have received licenses to operate steam automobiles in New York are Alfred G. Vanderbilt, Harry Payne Whitney, Charles E. Proctor, A. J. Barber, E. H. Lyon and some thirty odd others.

### Jump Spark Coil.

The spark coil illustrated herewith will be found of interest to makers of gas and gasoline engines. The coil has been devised as an improvement over the method commonly used whereby the spark was produced by the breaking of the primary circuit. This coil permits the use of fixed points in the engine cylinder, an advantage that is at once recognized by builders, as



JUMP SPARK COIL.

the moving parts under the former method were frequently the occasion of trouble.

This coil is mounted in a neat substantial case and can be used either with or without the vibrator, as shown. With battery giving a current of 4 to 6 volts a spark of one inch may be obtained from this coil. It is fitted with binding posts, ready to connect the wires. This coil is made by C. F. Splitdorf, 25 Vandewater St., New York.

**Hereafter the subscription price of THE AUTOMOBILE to foreign subscribers in countries embraced by the postal union will be one dollar and fifty cents per year, or fifteen cents per copy. Subscribers at the old rate will have their subscriptions extended four months, so that the price will be the same to all.**

## Trade Notes.

The Loomis automobile to be exhibited at the show at Madison Square Garden, is being sent by express, as it weighs but 315 pounds. It is said to be the lightest one of the kind built. The Loomis Automobile Co.'s factory is located at Westfield, Mass.

The American Electric Vehicle Co. was recently incorporated in New Jersey, and succeeds the Chicago company of the same name. A New York office is being opened, and the factory is being gotten in shape at Hoboken, N. J. The officers of the company are: J. Herbert Ballentine, President; C. E. Corrigan, Vice-President and General Manager, and George T. Lister, Secretary and Treasurer.

The gasoline motors built by the Hasbrouck Motor Company, of 68 Broad St., New York, are adapted for yachts and automobiles, and the company is now preparing to build both yachts and automobiles complete. One of the chief points claimed for these motors by the makers is an absolutely odorless exhaust.

The Automobile Company of America, 32 Broadway, New York, has recently secured the shops at Marion, N. J., which will be equipped with modern machinery for the production of automobiles. These shops have been vacant for some time, but when the company gets them in shape the town will put on a different air.

Something very artistic as well as instructive has just been issued by Sipe & Sigler, Cleveland, O. It describes the Willard automobile storage battery and gives some valuable pointers respecting its care and use. This pamphlet has been printed especially for the automobile battery, as their standard catalogue describes the storage battery for general use. Purchasers of electric automobiles or owners will find in this many important facts. It is distributed gratuitously.

St. Louis Motor Carriage Co., of St. Louis, Mo., has its factory equipped and a full force at work. The automobile is propelled by a hydrocarbon motor and has been thoroughly tested on the roads of the west. A recent catalogue presents the many excellent qualities of this self-propelled vehicle in an attractive manner.

One of the novelties in the automobile line recently turned out by the Colonial Automobile Co., 32 Hawley St., Boston, is a steam vehicle having three rear wheels, the center one being the driving wheel. Mr. Kent is the inventor, who believes that several difficulties are overcome by this arrangement and important advantages secured.

A compact battery for explosive engines is made by the Dow Portable Electrical Assistance Co., of Boston. One of the points claimed for this battery is that the current strength may be maintained throughout the life of the battery.

It seems that bicycle dealers are taking up the agency for automobiles supplementary to their regular line. Mr. C. J. Connolly, who took up the bicycle business in Rochester, N. Y., some fifteen years ago, has recently taken up the Kensington automobile.

The Milwaukee Automobile Co., of Milwaukee, Wis., expects to turn out complete carriages about the first of March. The shops are in shape, which were at one time occupied by the Milwaukee Eng. Co. The specialty of the company is a steam runabout, and orders now in hand will keep them busy some time.

A folder describing a gasoline motor for automobiles has recently been issued by the Quick Mfg. Co., of Paterson, N. J. The motor is described in detail, also its operation and care. It will prove of interest to any one who contemplates assembling an automobile.

The Vehicle Wheel Co., of 6 Murray St., New York, has a number of vehicle parts which are manufactured under its own patents. The Ajax ball bearing, especially well adapted to automobiles, is used on both wood and steel wheels. The literature issued by the company sets forth other specialties.

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## New Books.

"Horseless Vehicles, Automobiles and Motor Cycles, Operated by Steam, Hydro-Carbon, Electric and Pneumatic Motors," by Mr. Gardner D. Hiscox, is the title of a new book now on the press and will undoubtedly prove of great value to all interested in the construction or use of the self-propelled vehicle. 365 pages, 270 illustrations, large octavo. Price, $2.50.

"Gas Engine Construction," by Henry V. A. Parsell and Arthur J. Weed, is another new book soon to be out. It will be a practical book, giving working drawings and various details of these engines. The publishers of THE AUTOMOBILE will send any book published on electrical or mechanical subjects postpaid, on receipt of price. Catalogue free.


**THE QUICK MANUFACTURING CO.**

**52 Washington Street, Paterson, N. J.**

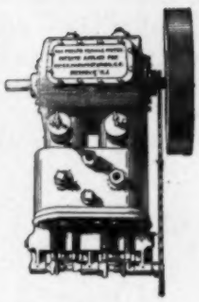
Manufacturers of

**Gasolene Vehicle Motors,**

**Special Parts, Etc.**

Also Manufacturers of

**AUTOMOBILES COMPLETE.**




## The Horse, Bicycle and Automobile.

Three hustling teams arranged a meet
Their metal to display;
Each recognized and known as fleet,
Each claimed the right of way.

The nice groomed horse in glossy coat
Was first to reach the stand;
He was contented with his lot
And first to make demand.

He always had the right of way;
This the world conceded;
When harnessed to the "One-horse-shay"
It was all we needed.

The Cycle wheel filed exceptions,
Not as to power or age,
But claiming a wise conception
Now appearing on the stage.

Adopting the planet motion
To aid the task of man;
Tho' claimed as a Yankee notion
Has been a leading van.

The Auto-mobile took the stand;
Though young, claimed equal rights,
The right to conquer and demand
That all shall test by flight.

The Air-ship—a near relation—
Is coming on the stage;
Now in training—on probation—
And soon will be of age.

The world is moving: mind and matter
Co-operate to-day;
The former guides and shapes the latter
Whether 'tis flesh or clay.—John Bachelder.

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## Patents.

**List of automobile patents granted during month of December.**

637,625—Apparatus for Forming Battery Plates. Issued to H. Leitner.
637,302—Sparking Igniter for Explosive Engines. Issued to G. S. Strong.
637,488—Gasoline Engine. Issued to J. B. Doolittle.
637,645—Vehicle Hub. Issued to S. B. McHenry.
637,469—Tire for Cycle and Other Wheels. Issued to O. Lavanchy.
637,717—Vehicle Wheel. Issued to H. M. Du Bois.
637,750—Motor Vehicle. Issued to J. W. Ogden.
637,658—Motor Vehicle. Issued to J. Pender.
637,665—Motor Vehicle. Issued to G. F. Reed.
637,296—Automobile Running Gear. Issued to G. S. Strong.
637,874—Apparatus for Applying Vehicle Tires. Issued to B. F. Kenna.
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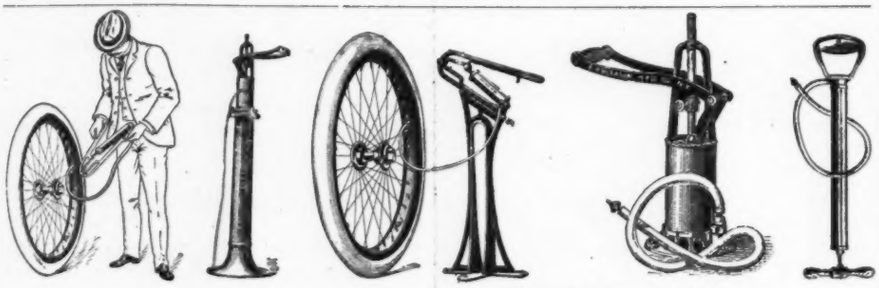
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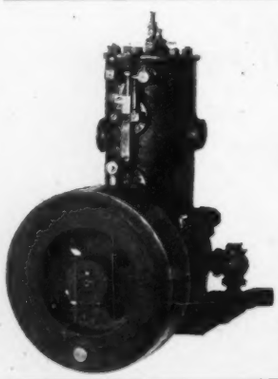
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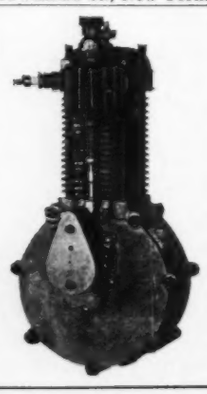

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